**1058**

B.E. (Computer Science and Engineering)

Sixth Semester

Elective – 1

CS-605B: Soft Computing (Reappear)

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** *Attempt* <u>*five*</u> *questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.*

x-x-x

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|---|---|---|
| Q1. | a) Differentiate between hard computing and soft computing. <br> b) Give a general definition of an agent, and then explain how a simple reflex agent operates. <br> c) Dart-throwing consists of randomly picking a candidate from the solution space. That candidate is accepted if it is the best solution found. In the light of this definition, what is the most fundamental difference and similarity between Simulated Annealing and dart-throwing? <br> d) State the properties of the processing element of an artificial neural network. <br> e) Define Defuzzification. List some of the methods to perform defuzzification. | 10 |

### Section-A

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|---|---|---|
| Q2. | a) Discuss briefly basic theory behind the Kalman Filter? | 5 |
| | b) An agent exists within an environment in which it can perform actions to move between states. On executing any action it moves to a new state and receives a reward. The agent aims t explore its environment in such a way as to learn which action to perform in any given state so a in some sense to maximize the accumulated reward it receives over time. <br> Give a detailed definition of a deterministic Markov decision process within the above state framework. | 5 |
| Q3. | a) Write a planning domain to solve a specific planning task of your choice using STRIPS formulation. | 6 |
| | b) Discuss about the Demorgan's law for the fuzzy sets. Say whether it is similar to that c classical sets. | 4 |
| Q4. | a) Define fuzzy logic. Using the inference approach, find the membership values for the triangula shapes for a triangle with angles as 60°, 40°, 80°. | 6 |
| | b) Discuss briefly Demster Shafer theory. | 4 |

### Section-B

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|---|---|---|
| Q5. | a) Write a basic architecture model for Kohonen self-organizing map. Use 2 input units and cluster units and a linear topology for the cluster units. Perform 2 epochs of training. | 6 |
| | b) Explain with the help of diagram architecture of adaptive Neuro-fuzzy inference concept. | 4 |
| Q6. | a) Define artificial neural network. Obtain the response for NAND function using linear separability concept. | 5 |
| | b) What is role of learning rate in neural net training? What is Gradient Descend and why it is so important in neural networks. What other techniques apart from learning rate can be used to optimize training process. | 5 |
| Q7. | Define genetic algorithm. A population consists of 3 different variables(x,y,z) whose values rang from -10 to +10. Initialize 6 chromosomes from this population. Explain various types c encoding, selection, crossover and mutation techniques for the above population. Perform tw generations. Assume a suitable fitness function | 10 |

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